REMARKS

Claims 1-41 are all the claims pending in the application.

1. Claim Rejections Under 35 U.S.C. § 112

The Examiner has rejected claims 32-36 under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, the Examiner contends that the claims do not specify the conditions in which f(x) correspond to the claimed values.

Applicant submits that the modifications to claims 32-36 obviate the rejection.

2. Claim Rejections Under 35 U.S.C. § 102

The Examiner has rejected claims 1-3, 7-13, 20, 21 and 37-41 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,461,655 to Vuylsteke *et al.* ["Vuylsteke"]. For at least the following reasons, Applicant traverses the rejection.

Claim 1 recites an apparatus for suppressing noise in an input image signal representing a radiographic image that comprises "a smoothing unit which processes said input image signal by using a smoothing filter so as to smooth said radiographic image; and a characteristic calculation unit which obtains at least one first characteristic of said input image signal by calculation using a function based on first information indicating an exposure dose with which said radiographic image has been produced; said smoothing unit adapts at least one second characteristic of the smoothing filter to said input image signal based on said at least one first characteristic." (emphasis added.)

According to Fig. 4a of Vuylsteke, the original image (2) is filtered by means of a low pass filter 41, and subsampled by a factor of two, which is implemented by computing the

resulting low resolution approximation image g_l (Col. 7, lines 37-42). The image g_2 is obtained by processing the image g_l using the process described above. Finally, the image g_L is obtained by iterating the above process L times.

The detail image b_0 at the finest level is obtained by interpolating the low resolution approximation g_l by doubling the number of rows and columns and pixelwise subtracting the interpolated image from the original image (2). The interpolation is effectuated by the interpolator 42, which inserts a column of zero values every other column, and a row of zero values every other row. The interpolator 42 then convolves the extended image with a low pass filter. The subtraction is done by the adder 43.

The above process is repeated on the low resolution approximation g_l instead of the original image 2, yielding an approximation of a still lower resolution g_2 and a detail image b_l. Sequence detail images b_i, where i=0...L-1, and a residual low resolution approximation g_L are obtained by iterating the above process L times.

The finest detail image b_0 is the same size as the original image. Please note that the image b_0 has high-frequency information (indicating "contrast" information), which is lost from the original image 2 during the above process.

According to Fig. 4b, a residual image is first interpolated by interpolator 51 to twice its original size and the interpolated image is then pixelwise added to the detail image of the coarsest level b'_{L-1}, using adder 52.

The noise reduction in Vuylsteke is accomplished by the interpolating process illustrated in Fig. 5, and the noise reduction is performed after the processes illustrated in Fig. 4a and before the process illustrated in Fig. 4b.

According to Fig. 5 of Vuylsteke, the image b_i (where i=0...L-1) is input and v (which is an approximately square mean value of the image b_i) is calculated from the image b_i. Then, V_n is calculated by analyzing a histogram. Finally, the noise suppression function is obtained from the calculated V_n and v (Col. 9, equation 1).

The Examiner contends that the "pixel value" of an image b_i of Vuylsteke corresponds to "exposure dose" of the present invention. Office Action at page 3. However, the exposure dose of the present invention would more closely correspond to the pixel value of an image g_L in the system of Vuylsteke. Therefore, contrary to the Examiner's contentions, the "pixel value" of an image b_i is not equal to the exposure dose. Moreover, Vuylsteke does not disclose reducing noise by using the pixel values of image gL, which depends on the exposure dose.

Accordingly, Applicant submits that Vuylsteke does not disclose or suggest an apparatus for suppressing noise comprising the claimed smoothing unit as set forth in claim 1.

Applicant submits that claims 7-11, 20 and 21 are patentable for reasons analogous to those given above with respect to claim 1.

Applicant submits that claims 2, 3, 12, 13 and 37-41 are patentable at least by virtue of their respective dependencies.

3. Claim Rejections Under 35 U.S.C. § 103

The Examiner has rejected claims 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over Vuylsteke in view of U.S. Patent No. 6,173,084 to Aach *et al.* ["Aach"]. For at least the following reasons, Applicant traverses the rejection.

Because Aach does not cure the deficient teachings of Vuylsteke given above with respect to claim 1, Applicant submits that claims 4 and 5 are patentable at least by virtue of their dependency on claim 1.

The Examiner has rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Vuylsteke in view of U.S. Patent No. 5,351,305 to Wood *et al.* ["Wood"]. For at least the following reasons, Applicant traverses the rejection.

Because Wood does not cure the deficient teachings of Vuylsteke given above with respect to claim 1, Applicant submits that claim 6 is patentable at least by virtue of its dependency.

4. Allowed Subject Matter

Applicant thanks the Examiner for allowing claims 14-19.

Applicant also thanks the Examiner for indicating that claims 22-31 would be allowable if rewritten in independent form. Applicant holds modifying these claims in abeyance until the subject matter of their respective base claims is resolved. Please note that Applicant has amended claims 22-26 to be consistent with the Specification.

Finally, Applicant thanks the Examiner for indicating that claims 32-36 would be allowable if amended to overcome the §112 rejection. Applicant submits that the §112 rejection has been overcome.

4. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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Date: April 6, 2006